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AGRICULTURAL MEMORANDUM NO. 413

A NOTE ON THE WEEKLY MEAN TEMPERATURES AT HELMSHORE AND HIGH MOWTHORPE WITH SPECIAL REFERENCE TO SPRING.

B Ingham.

Both these Experimental Husbandry Farms have been in existence for about 20 years and for at least 18 years weather observations have been published under the Agrometeorological Scheme for each week on the Shaw Calendar. A contribution on weather and climate was asked for so that it could be included in a general survey of the development of work at each farm over the years. Among the data examined were temperatures for which means and standard deviations were calculated, and this note draws special attention to one feature of the pattern.

The pattern at both farms is similar (indeed the same pattern appears at other agrometeorological stations in the north of England). There has been a false rise in temperature in late January and early February, followed by a fall which leads to the lowest mean weekly temperatures of the year in mid February. After this there has been a fairly sustained rise until July, though there has been a marked check in late May and an inflexion in early April. There has also been a check in the fall of temperature in November. The check in late May corresponds to the Singularity noted by P B Wright for southeast England, but from an agricultural point of view the behaviour of the mean temperature and its standard deviation before the inflexion are of considerable interest. From the diagram it may be deduced that there are some quite large variations of standard deviation from week to week and these variations lead to some curious results.

As a basis for argument, let it be assumed that the distribution of temperature is (statistically) normal. If the mean weekly temperature rises to about 43°F (6°C) in week 17 it can be seen from the diagram that this is about one standard deviation above the average. Now, if the standard deviation were the same for all weeks, then the chances of the mean weekly temperature being maintained above 43°F for the next five weeks would be substantially higher than they are under the circumstances of the diagram.

Using figures for High Mowthorpe, the chances are as follows:-

Chances of maintaining mean weekly temperature above 43°F (6°C)	assuming constant standard deviation	with observed standard deviation
Next week	1 in 5	1 in 5
Next 2 weeks	1 in 17	1 in 22½
Next 3 weeks	1 in 50	1 in 87
Next 4 weeks	1 in 140	1 in 315
Next 5 weeks	1 in 280	1 in 630

Farmers and growers have an instinctive mistrust of early warmth, and even on the assumption of constant standard deviations the hazards are quite high but it appears from the observations made over the past 18 or 19 years that the hazards are much higher still.

Although it is not easy to demonstrate, the set of mean temperatures and standard deviations appear to reduce the chances of continuing coldness. This appears to support the observation that at Oxford after a cold start to spring the temperature tends to catch up very quickly once the rise has started.

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Any comments or suggestions on this paper should be referred to the author.

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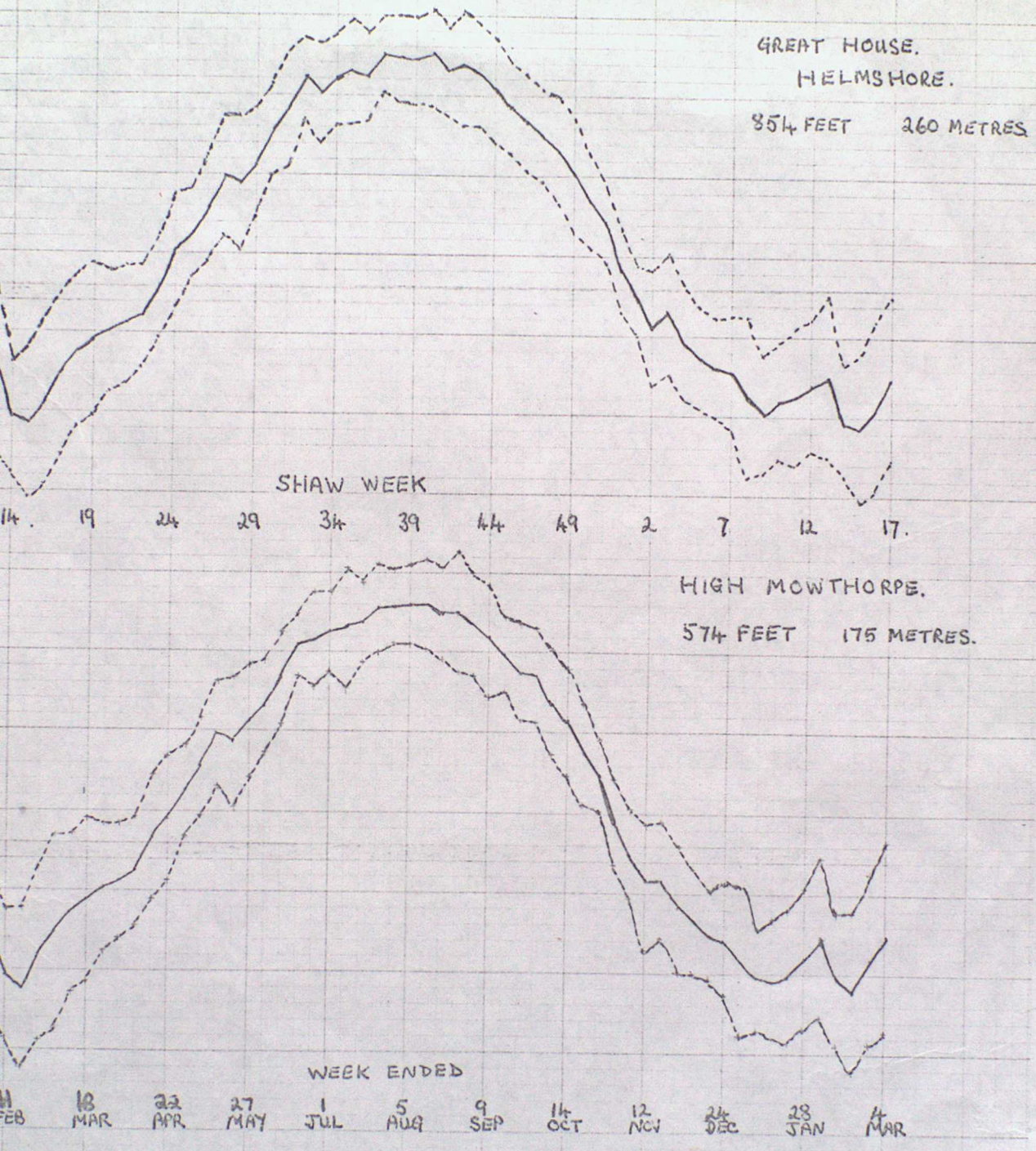

MEAN WEEKLY TEMPERATURE 1952-1970

PECKED LINES JOIN POINTS + OR - ONE σ FROM THE MEAN TEMPERATURE.